

UNDER CONSTRUCTION



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Phase 1 progresses successfully

The repair of the High Flux Reactor is progressing well and is in line with the planned schedule. During the formal kick-off meeting, the plan of action was discussed again with all the parties concerned. All the parties involved are in agreement about the working procedures, the distribution of responsibilities, the final planned schedule and all the safety aspects.

Phase 1 of the repair process involves dismantling the reactor and positioning the radiation shielding. As part of this process, the reactor core has been unloaded and the nuclear fuel and the experiments are now in storage. In addition, the control rods and their drive mechanisms have been removed and the sub-pile room emptied. The sub-pile room is the space underneath the reactor core from where the actual repairs will be made. At the moment, there is a temporary storage tent on the site of the High Flux Reactor, in which, amongst other things, the 16-ton MTR2 containers are being stored.

A trial bore hole has been made in the concrete floor containing the reducers and this has demonstrated that the radiation level is at an acceptably low level. This confirms the calculations carried out during the preparatory phase. Also, inspection of the reactor vessel has been completed ahead of schedule with satisfactory results (see the article on Vessel inspection below).

The next step in the repair process is to install the radiation shield on the base of the reactor tank (see the article on the Densimet base radiation shield). The reactor tank has been emptied for this purpose and the water in the tank partially pumped out. Work has started on positioning the base shield. Once this is installed, the rest of the water will be drained off. After a support structure has been constructed in the space under the reactor vessel, the building contractor will start removing the concrete. Directly after that, the aluminium cooling water pipe will be repaired. The top priority is the safety and health of all the employees working on the repair and in the surrounding area during this work. The restart of the reactor is planned for the second half of August 2010.

During the repair process, NRG will issue a progress update every month. A special page has been added to the NRG website that contains background information and images of the repair project: www.nrg.eu/hfr-repair. A video of the repair activities was also recently added to the website. Those interested in the progress of the repair will be able to register on the website to receive the newsletter on short term.



Practicing the placing of the shielding.



The specially designed 'butterfly' shield for the reactor core.



The temporary storage tent on the HFR site.

Vessel inspection reaches a positive conclusion



The inspection team at work.

Last week, the regular inspection of the HFR reactor vessel was completed successfully. In response to new technical developments and in keeping with NRG's goal of continuous improvement; the inspection programme for the reactor vessel has been extended. As part of this, the inspection was conducted using a new mast and manipulator system. The inspection team also used a new inspection technique (phased array), which allows measurements to be made more quickly and with more precise results. These improved techniques now make it possible to measure welds that were previously difficult to reach. Working in double shifts, the NRG Safety & Power inspection team completed the inspection one day earlier than planned. The inspection results show that the welds are in good condition. The results have been approved by the inspection supervisor Lloyd's Register and the Dutch Regulator. This left the road open for the next phase of the repair process; the installation of the radiation shielding materials in the reactor tank.

Densimet base radiation shield



Placement of the temporary grids

During the repair, a base radiation shield made of Densimet will protect the workers against the residual radiation emanating from the reactor core area. Positioning the base shield is a precise exercise that requires meticulous preparation. Shield Project Managers Chris van Wijk and Johan Best were closely involved in these preparations as well as in performing the work itself. "The Densimet shield is manufactured from a tungsten alloy and was made especially for this purpose. It has a density of nineteen kilos per litre, that is one and a half times denser than lead. It was decided to use this material, because on the one hand it's dense enough to block the radiation and on the other hand it's easy to cut to the required size," explained Van Wijk. Manipulators are used to install the base shield in numbered parts like a jigsaw. The team recently practiced this process on the HFR site. Best says: "Almost all the parts were made to measure, so that they fit exactly. Where necessary, we were able to reshape certain parts while we were practicing how to install them. We then laid the parts out in sequence and stored them in containers so that they were ready to be positioned". The team has installed the Densimet radiation shield in the base of the half drained reactor tank. To shield the reactor core itself, a kind of folding 'butterfly' has been designed and manufactured from coated Densimet. This will also be positioned using a manipulator. Once the full base radiation shield has been fully installed, a 40cm-thick concrete plate will be positioned over the top of the reactor tank so that the repairs can be carried out safely.



The mockup of the Densimet shielding



Working on the temporary grid in the vessel.